

Appendix C

NOAA Data Report ERL PMEL-22

BEAUFORT SEA MESOSCALE CIRCULATION STUDY: HYDROGRAPHY
HELICOPTER OPERATIONS, APRIL, 1987

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Seattle, Washington
March 1988



UNITED STATES
DEPARTMENT OF COMMERCE

C. William Verity
Secretary

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ATMOSPHERIC ADMINISTRATION

Environmental Research
Laboratories

Vernon E. Derr,
Director

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BEAUFORT SEA MESOSCALE CIRCULATION STUDY:
HYDROGRAPHY HELICOPTER OPERATIONS, APRIL, 1987

K. Aagaard¹, S. Salo¹, and K. Krogslund²

1. INTRODUCTION

This report presents data from 28 hydrographic stations occupied in April, 1987 over the Beaufort Sea continental shelf and slope, as part of the Beaufort Sea Mesoscale Circulation Study (Table 1). The casts (Figure 1), which were made along 4 transects, each roughly perpendicular to the coast, repeat most of the stations sampled in October, 1986 from the USCGC Polar Star (Aagaard *et al.*, 1987).

2. METHODOLOGIES

Personnel and equipment were transported to each hydrographic station site by NOAA helicopters. A hole was augered in the ice, a tent was erected over the hole, and the cast was made from the tent. A Neil Brown Mark 111 CTD system, modified for Arctic work, was used during this experiment. Each cast was done in two parts, as follows. The profile was recorded, then the CTD fish was brought back to the surface. As it was lowered the second time, five or six 5 l Niskin bottles were clamped to the wire. They were tripped when the fish was again at depth.

CTD data were analyzed as outlined in Giles and McDougall (1986) and Aagaard *et al.* (1987). Salinity and sigma-t were calculated using the algorithms of Fofonoff and Millard (1983).

All water samples were analyzed for dissolved oxygen and nutrients in Deadhorse (Prudhoe Bay), Alaska. Nutrients were determined with a 5-channel Technicon Auto Analyzer II system and the method outlined by Whitlege *et al.* (1981). Oxygen concentration was measured by the Carpenter modification of the Winkler titration (Carpenter, 1965). Samples were also taken for freons and tritium. These are being analyzed separately by other investigators.

The discrete sample values are listed in Table 2. Salinity/nutrient correlation diagrams suggest that the five nitrate and six reactive silicate values marked in Table 2 by asterisks are anomalously high. However, a review of the sampling and analytical procedures suggests no systematic source of error.

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3. ACKNOWLEDGMENTS

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4. REFERENCES

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- Giles, A.B. and T.J. McDougall, 1986: Two methods for the reduction of salinity spiking of CTD's. *Deep-Sea Research* 33(9), 1253-1274.
- Whitledge, T.E., S.C. Malloy, C.J. Patton, and C.D. Wirick, 1981: Automated nutrient analyses in seawater. Report #BNL-5 1398, Brookhaven National Laboratory, Upton, New York.

DATA

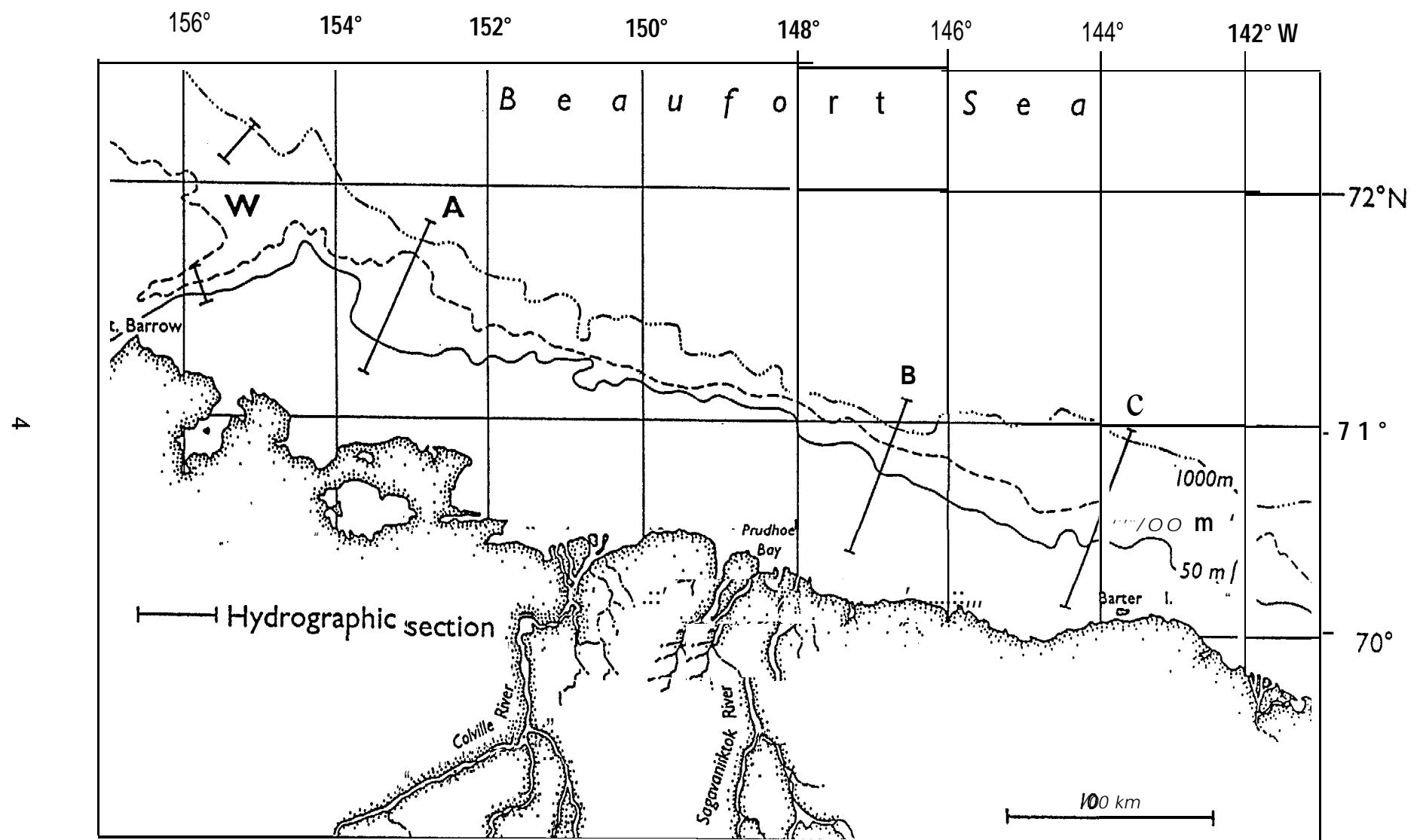


Figure 1. --Location of CTD transects

Table 1. CTD Chronology and Positions

Station	Cast#	Time (UTC)	N. Lat.	W. Long.	Depth (m)
c 09	1	210911 April	70°56.3'	143°33.3'	>1000
C 08	2	194412 April	70°51.0'	143°41.0'	>1000
C 06	3	224112 April	70°38.9'	143°55.9'	304
c 04	4	005713 April	70°28.8'	144°11.2'	52
c 02	5	183113 April	70°15.5'	144°23.8'	36
c 03	6	210813 April	70°21.0'	144°16.4'	39
C 05	7	002514 April	70°34.0'	144°03.6'	60
A 09	8	201518 April	71°52.4'	152°41.3'	>1000
A 08	9	004019 April	71°46.9'	152°54.4'	808
A 07	10	202020 April	71°41.8"	153°00.1'	156
A 06	11	221020 April	71°36.2'	153°09.9'	56
A 05	12	234220 April	71°29.9'	153°18.1'	57
A 04	13	010621 April	71°23.7'	153°26.8'	56
A 03	14	192721 April	71°18.8'	153°33.8'	46
A 02	15	215921 April	71°13.0'	153°39.9'	26
w 12	16	231521 April	71°31.7'	155°46.0'	124
w 11	17	180222 April	71°35.0'	155°46.8'	200
w 03	18	205522 April	7213.7'	155°07.4'	>1000
w 04	19	000423 April	72°08.2'	155°18.9'	498
B 09	20	183926 April	71°03.3'	146° 38.3'	>1000
B 08	21	224026 April	70°57.7'	146°44.5'	859
B 07	22	180827 April	70°53.1'	14649.3'	68
B 06	23	195727 April	70°49.9'	146°53.8'	60
B 05	24	212927 April	70° 45.1'	147°00.6'	48
B 04	25	225227 April	70° 42.1 '	147°04.6'	44
B 03	26	172028 April	70°37.7'	147°07.7'	38
B 02	27	185528 April	70°32.0'	147°15.0'	32
B 01	28	201628 April	70° 27.8'	147°20.0'	23

Station Cast Time (UCT) Latitude ("N) Longitude ("W) Bottom Depth(m)
C09 1 2109 11 Apr 1987 70° 56.3 143° 33.3 >1000

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂(ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	29.623	-1.606	23.808	9.05	0.79	8.74	2.24	0.04	0.07
22.3	30.958	-1.405	24.888	9.14	0.91	8.04	2.29	0.05	0.25
67.3	32.470	-1.314	26.112		1.50	24.77*	7.81	0.03	0.08
112.3	32.944	-1.490	26.502	6.60	1.76	34.38*	12.94	0.03	0.10
147.3	33.457	-1.344	26.914		1.66	32.87*	12.44	0.03	
497.3	34.831	0.427	27.946	6.93	0.87	9.02"	7.57	0.02	0.00

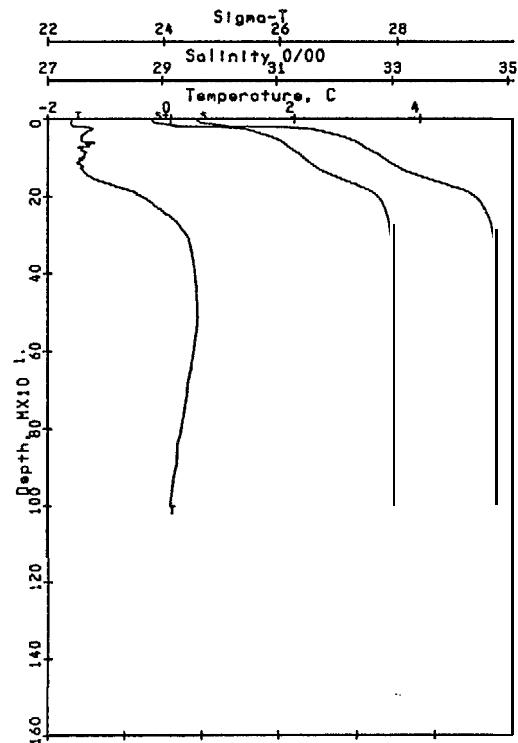
Station Cast Time (uCT) Latitude (ON) Longitude (°W) Bottom Depth (m)
c08 2 1944 12 Apr 1987 70° 51.0 143° 41.0 >1000

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (Um/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	29.808	-1.637	23.954	9.23	0.79	8.47	2.38	0.03	0.01
22.3	30.185	-1.578	24.264	9.19	0.81	7.86	2.38	0.03	0.02
42.3	31.953	-1.360	25.694		1.12	12.47	4.90	0.02	0.02
72.3	32.566	-1.405,	26.192		1.61	27.80*	14.07*	0.02	0.10
117.3	33.106	-1.474	26.632	6.39	1.88	37.61*	17.64*	0.02	0.00
497.3	34.838	0.424	27.952	6.82	0.88	8.95	11.99	0.02	0.01

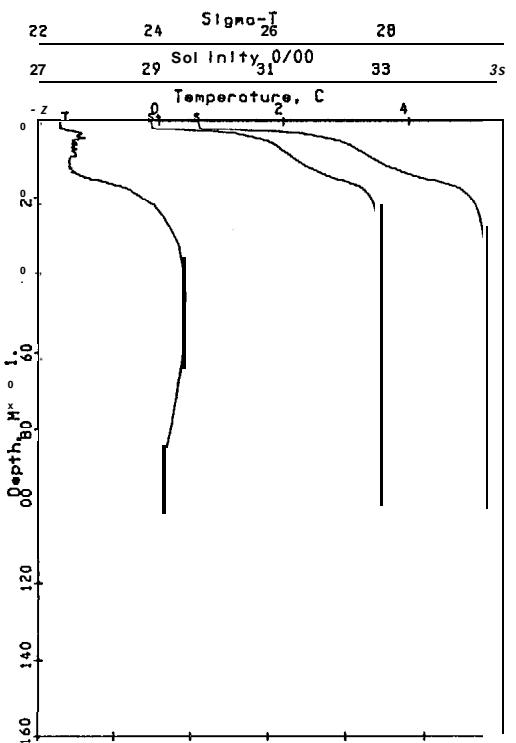
Station Cast Time (UCT) Latitude (ON) Longitude ("W) Bottom Depth (m)
c06 3 2241 12 Apr 1987 70° 38.9 143° 55.9 304

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	28.922	-1.616	23.239	9.07	0.77	9.50	1.72	0.03	0.06
22.3	28.990	-1.615	23.294	9.09	0.77	9.50	1.80	0.03	0.02
47.3	31.584	-1.290	25.393		1.03	9.19	3.31	0.02	0.06
72.3	32.313	-1.423	25.988	7.53	1.42	22.11	10.69*	0.03	0.06
97.3	33.181	-1.397	26.692	6.67	1.72	33.83*	17.24*	0.03	0.14
287.3	34.778	0.316	27.909	6.74	0.89	10.38	15.26'	0.03	0.04

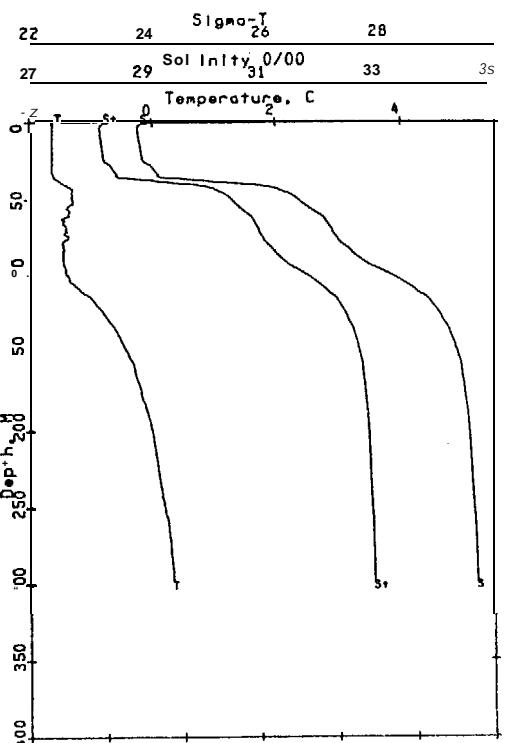
7



Ref. no. 1 Sta. C09 70.94 N
Time = 871012109
Beaufort 143.56 W



Ref. no. 2 Sta. C08 70.85 N
Time = 871021944
Beaufort 143.68 W



Ref. no. 3 Sta. C06 70.6 S
Time = 87102224S
Beaufort 143.93 W

Station C04 Cast 4 Time (UCT) 0057 13 Apr 1987 Latitude ("N) 70° 28.8 Longitude ("W) 144° 11.2 Bottom Depth(m) 52

Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	Po ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
2.3	29.397	-1.613	23.624	9.20	0.75	10.16	1.81	0.02	0.06
7.3	29.402	-1.615	23.629	9.17	0.75	10.16	1.80	0.02	0.06
12.3	29.404	-1.615	23.630	9.26	0.75	10.15	1.79	0.02	0.05
22.3	30.171	-1.644	24.253	8.84	0.88	9.24	2.20	0.02	0.06
32.3	31.739	-1.225	25.517	8.12	1.12	13.35	5.08	0.02	0.05
45.3	32.294	-1.313	25.970	7.59	1.22	1 9 . 9 6	7,04	0.02	0.05

Station C02 Cast 5 Time (UCT) 1831 13 Apr 1987 Latitude ("N) 70° 15.5 Longitude ("W) 144° 23.8 Bottom Depth (m) 36

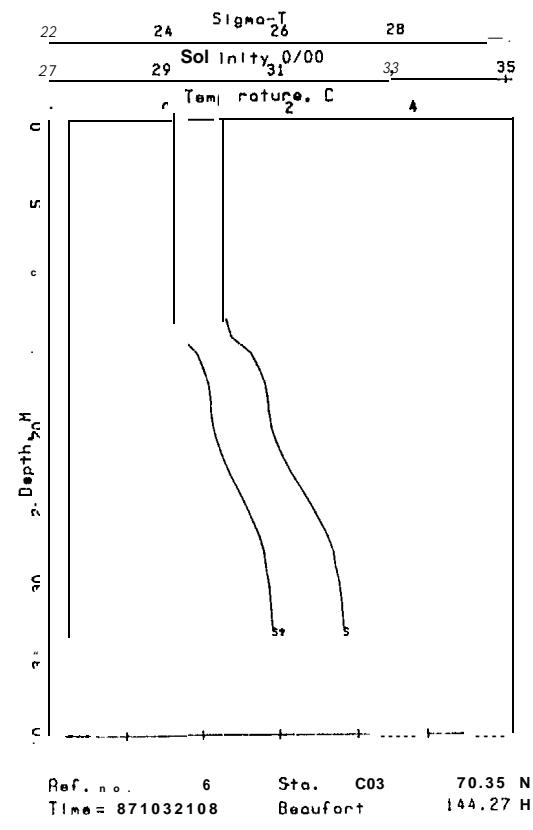
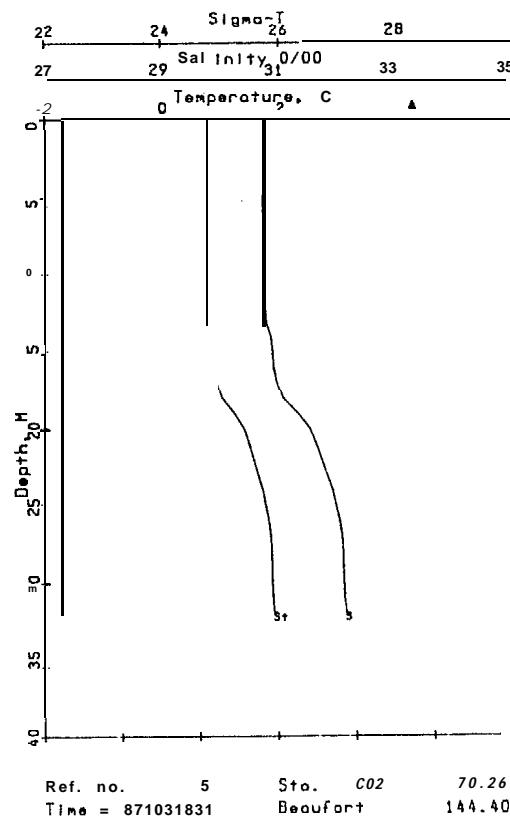
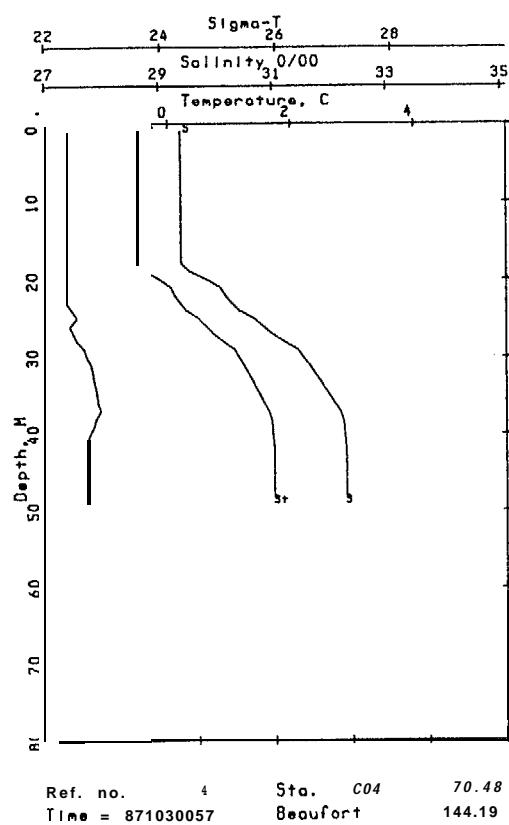
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	Po ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
2.3	30.805	-1.681	24.769	9.08	0.88	10.22	2.04	0.01	0.03
7.3	30.816	-1.687	24.777	9.10	0.90	10.21	2.07	0.03	0.03
12.3	30.835	-1.692	24.794	9.05	0.91	10.21	2.06	0.03	0.00
17.3	31.038	-1.709	24.959	8.86	0.96	12.21	2.98	0.01	0.03
22.3	31.790	-1.743	25.570	8.48	1.04	15.01	4.07	0.01	0.02
29.3	32.159	-1.752	25.870	8.37	1.07	16.31	4.51	0.02	0.11

Station C03 Cast 6 Time (UCT) 2108 13 Apr 1987 Latitude ("N) 70° 21.0 Longitude ("W) 144° 16.4 Bottom Depth (m) 39

Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	Po ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
2.3	30.051	-1.648	24.156	9.13	0.80	11.19	2.15	0.02	0.10
7.3	30.079	-1.655	24.179	9.11	0.84	11.18	2.19	0.02	0.21
12.3	30.130	-1.660	24.220	9.08	0.83	11.18	2.18	0.02	0.08
17.3	30.793	-1.698	24.759	8.97	0.90	11.68	2.82	0.01	0.07
25.3	31.584	-1.706	25.402	8.60	1.02	13.68	4.23	0,02	0.06
32.3	31.118	-1.727	25.836	8.27	1.08	16.18	4.96	0.02	0.05

∞

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<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth(m)</u>
C05	7	0025 14 Apr 1987	70° 34.0	144° 03,6	60

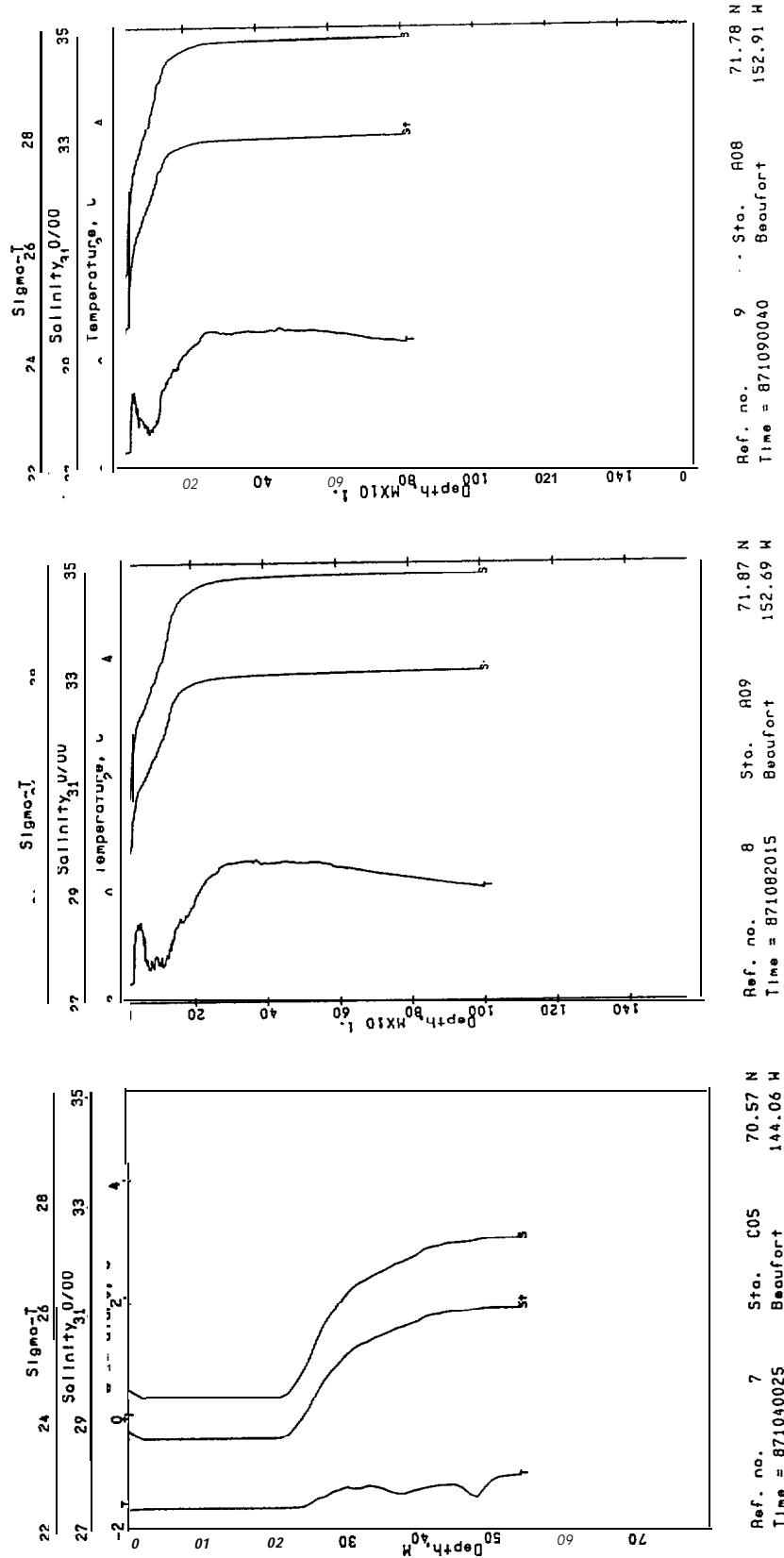
<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	29.484	-1.618	23.695	9.11	0.76	10.63	1.98	0.02	0.07
12.3	29.486	-1.618	23.697	9.04	0.77	10.53	2.06	0.02	0.03
22.3	29.555	-1.615	23.753	9.06	0.82	10.52	2.23	0.02	0.26
32.3	31.571	-1.292	25.383	8.82	0.99	9.12	2.87	0.02	0.04
47.3	32.310	-1.405	25.985	7.68	1.29	20.13	8.23	0.02	0.05
52.3	32.380	-1.101	26.033	7.49	1.32	21.93.	8.96	0.02	0.08

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth (m)</u>
A0 9	8	2015 18 Apr 1987	71° 52.4	152° 41.3	>1000

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	30.515	-1.674	24.533	8.46	2.46	0.82	1.04	0.23	0.14
42.3	31.880	-0.749	25.617	7.79	1.01	6.14	3.33	0.23	0.15
112.3	33.220	-1.394	26.723	6.53	1.91	24.71	12.29	0.22	0.34
347.3	34.820	0.416	27.937	6.79	1.82	1.16	10.66	0.22	1.12
452.3	34.850	0.412	27.962	6.69	0.78	1.08	10.81	0.22	0.04
997.3	34.890	-0.052	28.020	6.94	0.80	1..49	10.99	0.20	0.07

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth (m)</u>
A0 8	9	0040 19 Apr 1987	71° 46.9	152° 54.4	. 808

NO SAMPLES TAKEN



<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth(m)</u>
A0 7	10	2020 20 Apr 1987	71° 41.8	153" 00.1	156

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (pm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	30.591	-1.658	24.595	8.52	0.73	0.00	0.86	0.17	0.03
22.3	30.594	-1.658	24.597	8.51	1.01	0.00	0.86	0.18	0.09
37.3	30.801	-1.515	24.763	8.36	0.84	1.58	1.52	0.18	0.35
92.3	33.034	-1.219	26.567	6.70	1.46	19.66	11.80	0.18	0.02
117.3	33.245	-1.284	26.740	6.52	1.45	20.77"	11.11	0.17	0.00
147.3	33.882	-0.851	27.242	6.46	1.20	16.44	11.14	0.18	0.00

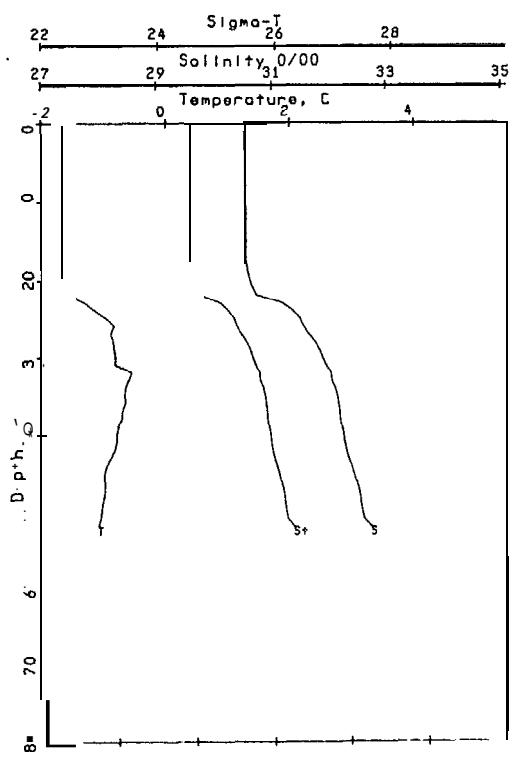
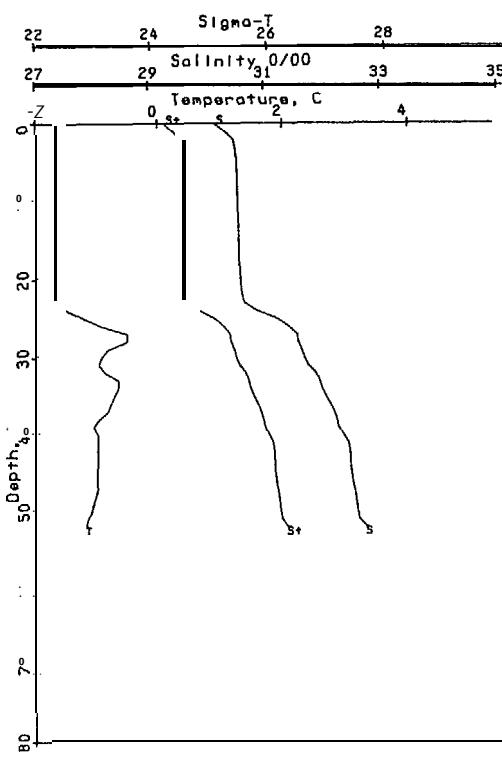
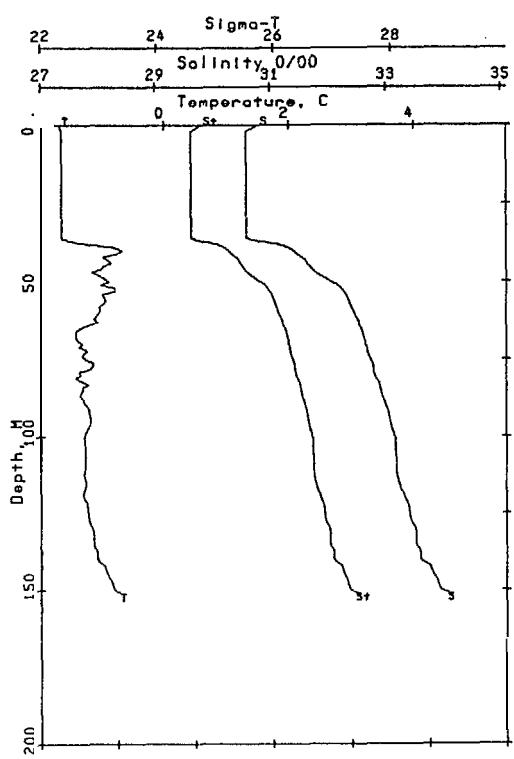
<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth (m)</u>
A0 6	11	2210 20 Apr 1987	71° 36.2	153" 09.9	56

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
2.3	30.482	-1.672	24.506	8.55	0.70	0.00	0.86	0.18	0.00
7.3	30.550	-1.672	24.561	8.56	0.74	0.00	0.79	0.18	0.00
12.3	30.564	-1.672	24.573	8.58	0.72	0.00	0.76	0.18	0.00
22.3	30.629	-1.642	24.626	8.44	0.79	0.00	0.95	0.18	0.00
32.3	31.888	-0.853	25.627	7.65	1.11	5.62	4.07	0.18	0.02
47.3	32.540	-0.986	26.159	7.15	1.40	6.27	8.45	0.18	0.00

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<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude (°W)</u>	<u>Bottom Depth (m)</u>
A05	12	2342 20 Apr 1987	71° 29.9	153° 18.1	57

<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>PO₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
7.3	30.553	-1.671	24.564	8.54	0.77	0.00	0.87	0.18	0.00
17.3	30.562	-1.670	24.571.	8.52	0.66	0.00	0.93	0.16	0.00
32.3	32.018	-0.558	25.722	7.64	1.08	6.12	4.34	0.16	0.00
42.3	32.285	-0.824	25.947	7.15	1.12	10.87	6.36	0.17	0.00
47.3	32.502	-0.984	26.128	7.01	1.29	14.22	7.41	0.17	0.00

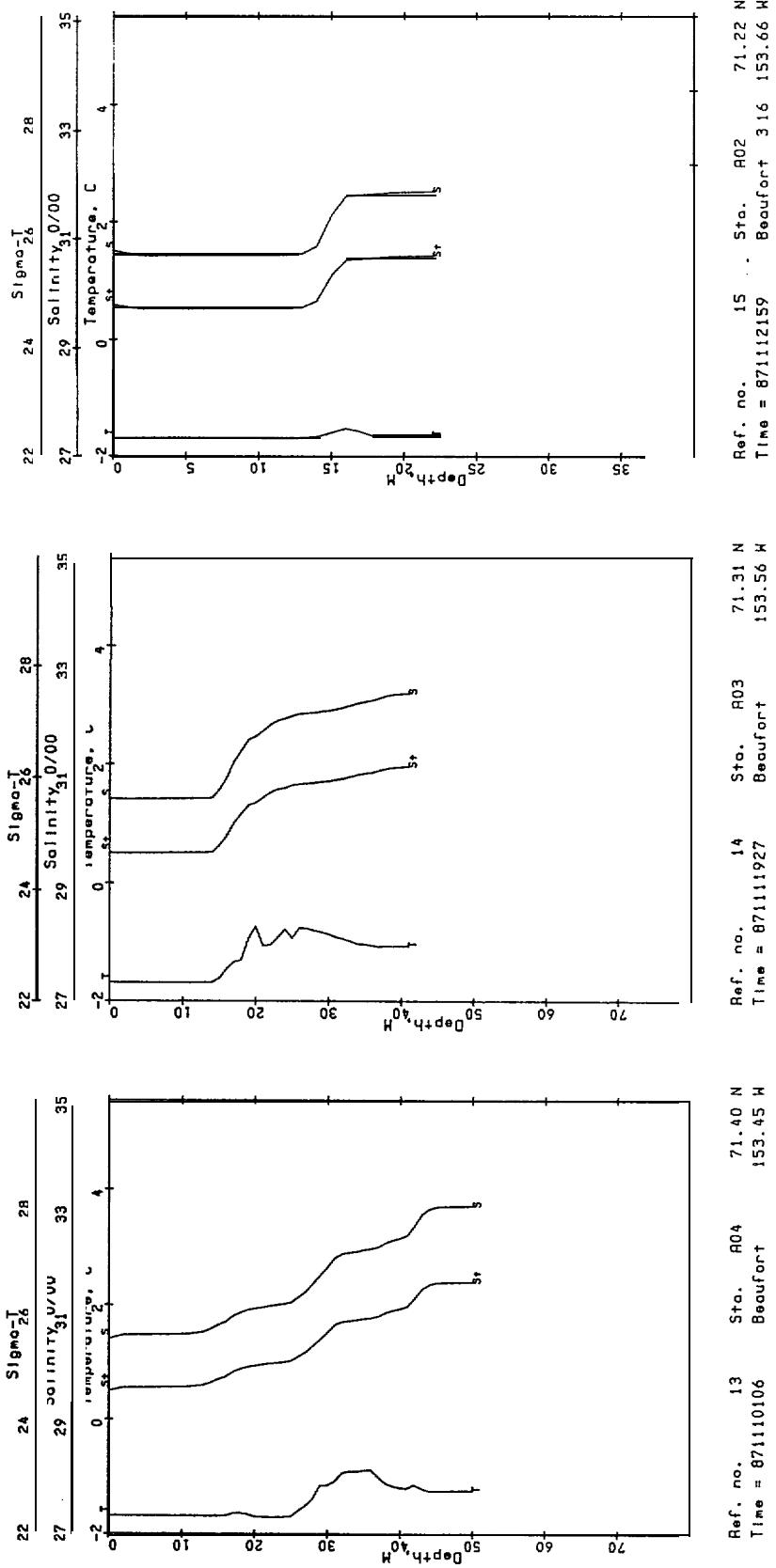


<u>Stat</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude (ON)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth(m)</u>
A04	13	0106	21	Apr 1987	71°	23.7	153°	26.8	50
Depth	S (PSU)	T (°C)	Sienna-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
7.3	30.777	-1.681	24.746	8.54	0.98	6.25	1.15	0.01	0.02
17.3	31.116	-1.640	25.021	8.24	0.94	7.82	1.72	0.00	0.00
32.3	32.280	-0.958	25.947	7.42	1.30	19.08	6.12	0.00	0.00
37.3	32.404	-1.020	26.050	7.08	1.33	19.20	6.48	0.00	0.00
47.3	33.165	-1.253	26.674	6.55	1.92	27.87	11.61	0.07	0.00

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<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth (m)</u>
A0 3	14	1927	21	Apr 1987	71°	18.8	153°	33.8	46
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
2.3	30.695	-1.680	24.680	8.70	1.14	6.40	1.08	0.01	0.00
12.3	30.706	-1.680	24.689	8.74	0.97	5.95	1.06	0.01	0.00
17.3	31.362	-1.332	25.214	7.95	1.05	9.94	2.84	0.00	0.00
22.3	32.031	-1.050	25.749	7.47	1.26	15.06	5.03	0.00	0.00
27.3	32.238	-0.770	25.907	7.25	1.36	18.00	6.50	0.00	0.00
37.3	32.511	-1.073	26.138	7.02	1.40	21.68	7.97	0.00	0.00

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth(m)</u>
A0 2	15	2159	21	Apr 1987	71"	13.0	153°	39.9	26
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
2.3	30.696	-1.687	24.680	8.00	0.78	5.64	1.05	..0.01	0.00
6.3	30.703	-1.688	24.686	8.00	0.83	.5.68	1.13	0.02	0.00
9.3	30.708	-1.690	24.690	8.49	1.06	5.96	1.24	0.01	0.00
13.3	30.729	-1.688	24.707	8.49	1.00	6.98	1.29	0.01	0.00
17.3	31.816	-1.577	25.588	8.62	1.04	10.65	2.39	0.00	0.00
20.3	31.868	-1.649	25.631	8.64	0.99	10.77	2.48	0.01	0.00

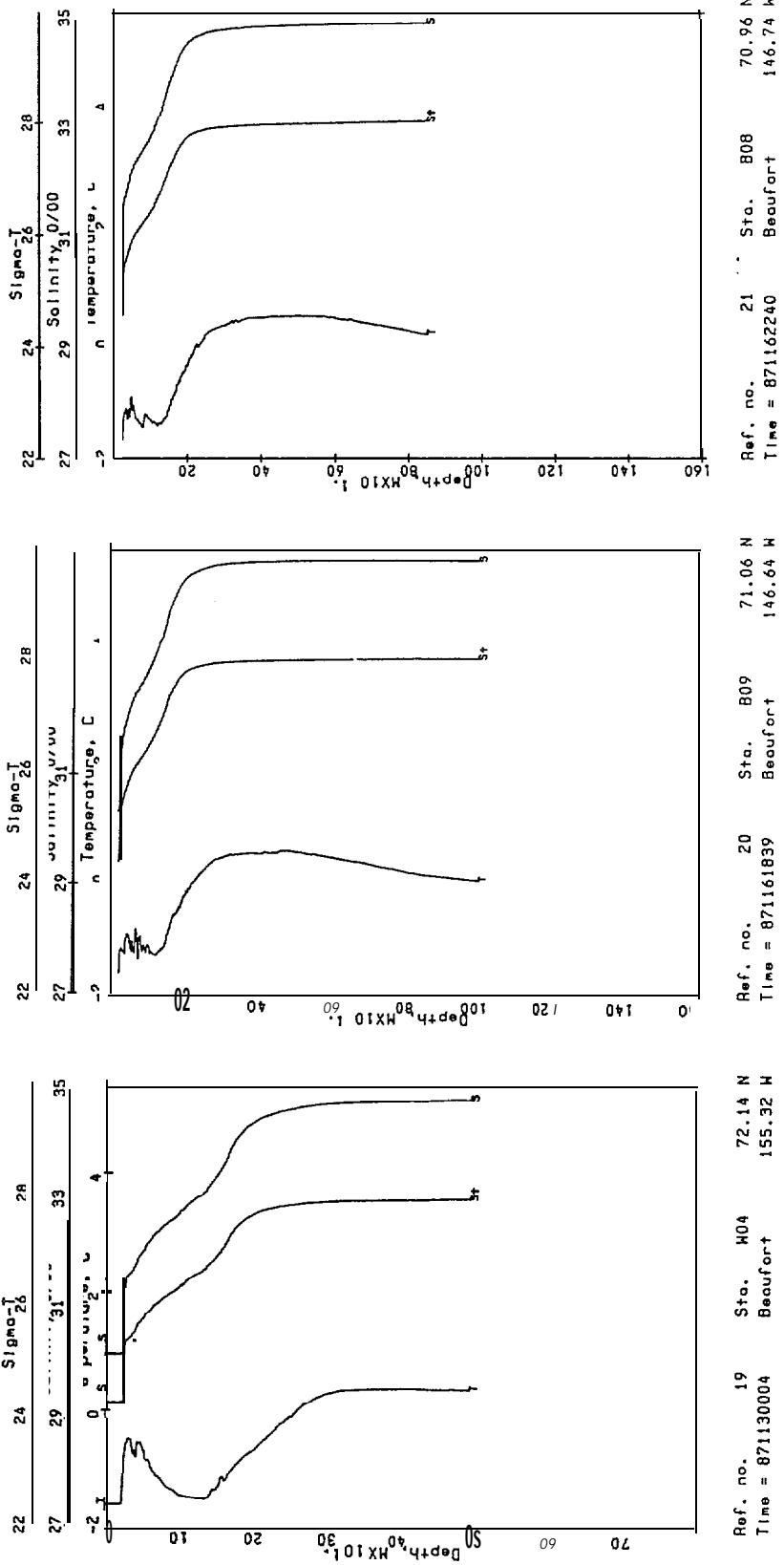


<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth(m)</u>
Wo 4	19	0004 23 Apr 1987	72° 08.2	155° 18.9	498
NO SAMPLES TAKEN					

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude ("W)</u>	<u>Bottom Depth(m)</u>				
B09	20	1839 26 Apr 1987	71° 03.3	146° 38.3	>1000				
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
7.3	30.302	-1.669	24.360	9.21	0.74	4.42	0.02	0.79	0.00
47.3	32.007	-1.058	25.730	8.07	1.10	11.33	3.34	0.66	0.00
82.3	32.583	-1.057	26.196	7.27	1.40	21.70	7.44	0.66	0.00
122.3	33.124	-1.344	26.644	6.69	1.60	28.97	10.84	0.65	0.00
467.3	34.855	0.435	27.964	6.81	0.80	5.21	10.44	0.65	0.00
997.3	34.896	-0.040	28.024	6.93	0.81	5.27	9.68	0.64	0.00

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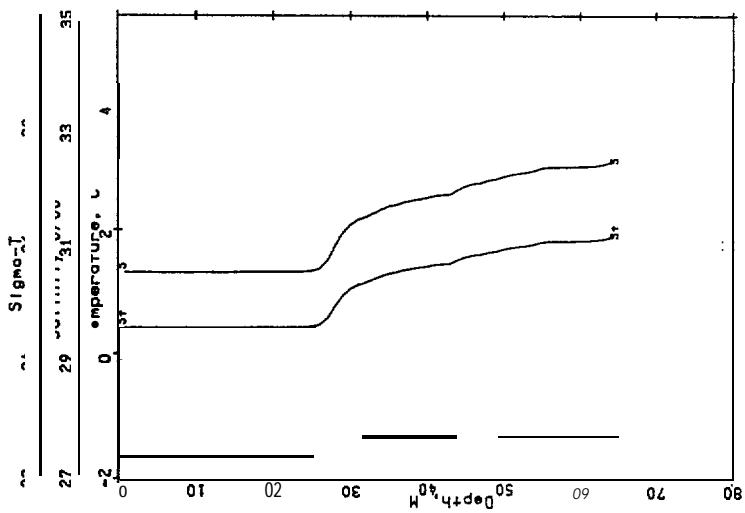
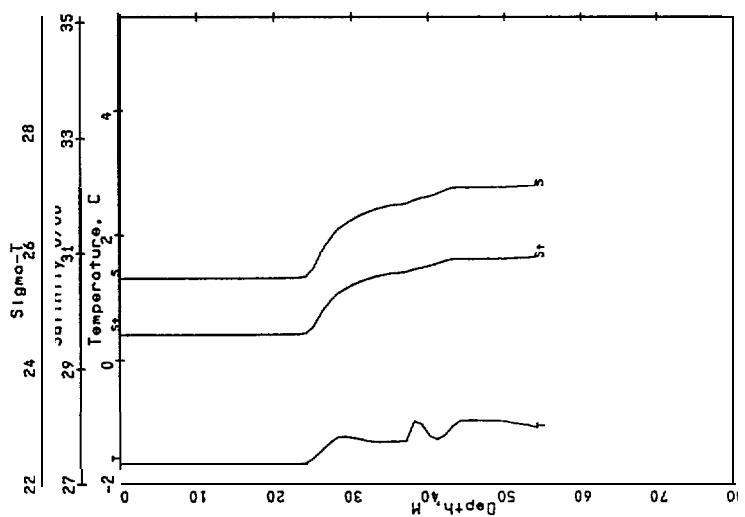
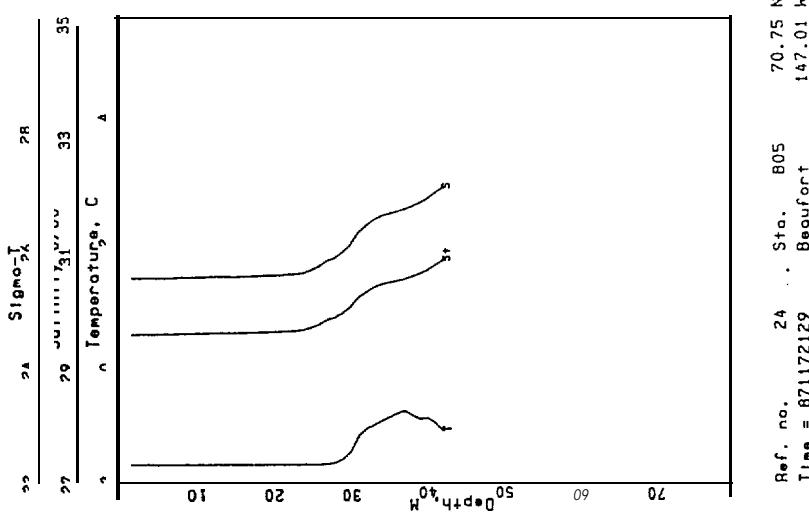
<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>	<u>Latitude ("N)</u>	<u>Longitude (°W)</u>	<u>Bottom Depth (m)</u>				
B08	21	2240 26 Apr 1987	70° 57.7	146° 44.5	859				
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)
7.3	30.530	-1.673	24.545	9.12	0.55	4.60	0.38	0.42	0.00
17.3	30.536	-1.672	24.550	9.12	0.56	4.57	0.46	0.43	0.00
87.3	32.631	-1.239	26.241	7.18	1.42	22.59	7.68	0.44	0.00
167.3	34.002	-0.894	27.340	6.42	1.32	23.19	10.75	0.049	0.00
467.3	34.848	0.405	27.961	6.78	0.80	5.56	9.52	0.53	0.00
837.3	34.891	0.111	28.013	6.95	0.80	4.92	8.97	0.53	0.00



<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth(m)</u>	
B07	22	1808	27	Apr 1987	70"	53.1	146°	49.3	68	
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)	
7.3	30.593	-1.673	24.596	9.00	0.80	8.01	1.60	0.03	0.00	
17.3	30.604	-1.662	24.605	9.04	0.82	8.09	1.67	0.02	0.00	
27.3	30.807	-1.541	24.768	8.82	0.90	8.16	2.10	0.02	0.00	
37.3	31.816	-1.318	25.582	8.67	1.03	9.66	3.01	0.02	0.29	
47.3	32.151	-1.261	25.852	7.74	1.23	17.50	6.92	0.02	0.01	
57.3	32.424	-1.326	26.075	7.41	1.38	22.26"	9.03	0.03	0.00	

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude (ON)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth (m)</u>	
B06	23	1957	27	Apr 1987	70°	49.9	146°	53.8	60	
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)	
7.3	30.575	-1.672	24.582	9.03	0.83	8.05	1.73	0.03	0.00	
17.3	30.576	-1.672	24.582	9.03	0.83	8.05	1.66	0.03	0.00	
27.3	31.245	-1.340	25.119	8.77	0.93	8.71	2.38	,0.04	0.00	
37.3	31.865	-1.307	25.622	8.15	1.11	13.04	4.85	0.04	0.00	
42.3	32.086	-1.220	25.798	7.66	1.20	18.05	6.26	0.04	0.00	
47.3	32.143	-0.988	25.838	7.70	1.22	18.12	6.48	0.04	0.00	

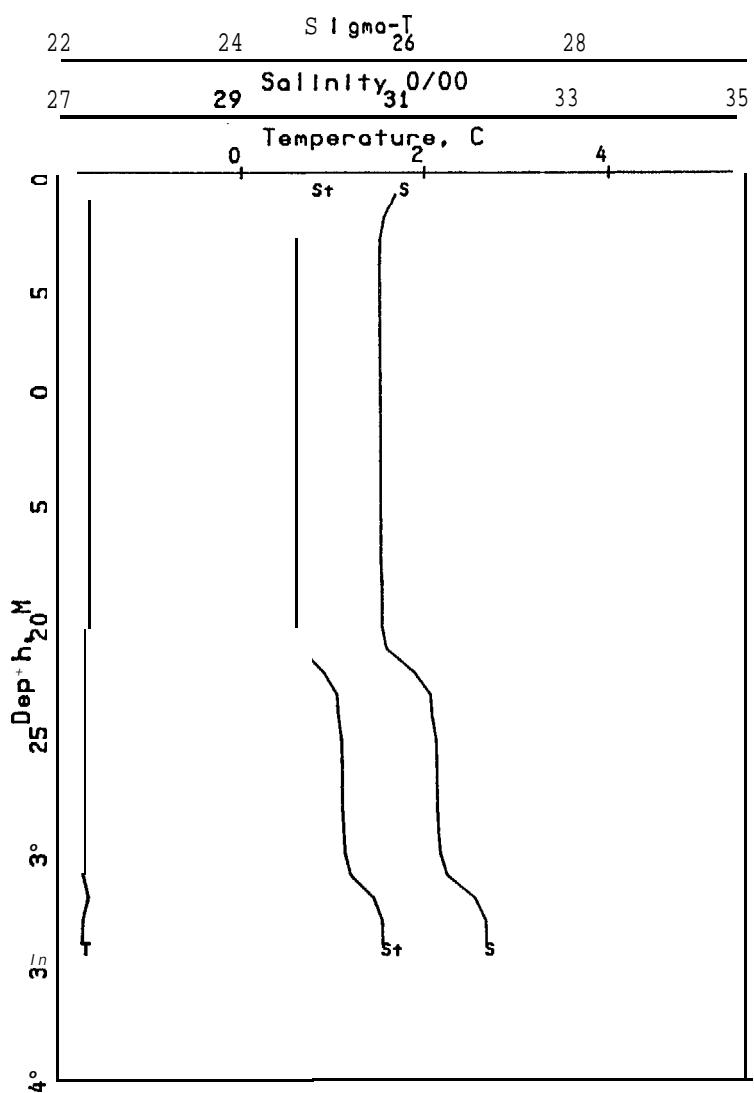
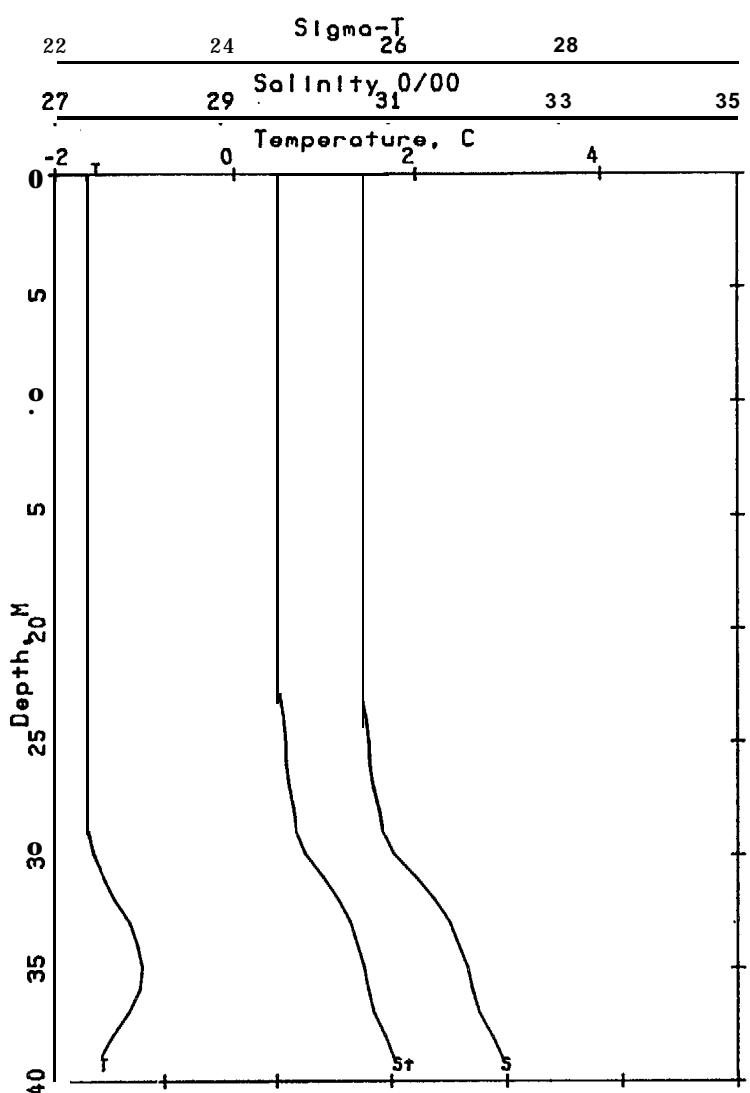
<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longitude ("W)</u>		<u>Bottom Depth (m)</u>	
B05	24	2129	27	Apr 1987	70"	45.1	147°	00.6	48	
Depth	S (PSU)	T (°C)	Sigma-t	O ₂ (ml/l)	PO ₄ (μm/l)	SiO ₄ (μm/l)	NO ₃ (μm/l)	NO ₂ (μm/l)	NH ₃ (μm/l)	
7.3	30.627	-1.677	24.624	9.08	0.83	8.26	1.82	0.04	0,06	
17.3	30.651	-1.679	24.644	9.02	0.85	8.34	1.82	0.04	0.00	
22.3	30.679	-1.680	24.667	9.04	0.86	8.58	1.91	,0.04	0.00	
27.3	30.908	-1.672	24.852	8.87	0.90	9.24	2.47	0.04	0.00	
32.3	31.486	-1.110	25.309	8.52	0.97	9.66	3.06	0.04	0.00	
37.3	31.764	-0.828	25.526	8.27	1.03	10.99	3.84	0.04	0.00	



<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>		<u>Latitude (ON)</u>		<u>Longitude (°W)</u>		<u>Bottom Depth(m)</u>	
B04	YF--	2252	27 Apr 1987	70°	42.1	147°	04.6	44	
<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>Po₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
7.3	30.665	-1.648	24.654	9.06	0.84	8.30	1.82	0.04	0.00
17.3	30.667	-1.652	24.656	9.06	0.84	8.38	1.88	0.04	0.00
22.3	30.684	-1.647	24.670	9.01	0.86	8.71	1.91	0.05	0.00
27.3	30.827	-1.668	24.787	8.85	0.88	9.29	2.36	0.05	0.01
32.3	31.534	-1.328	25.353	8.33	1.01	11.62	3.70	0.05	0.00
37.3	32.063	-1.160	25.778	7.85	1.07	15.87"	4.97	0.05	0.04

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>		<u>Latitude (ON)</u>		<u>Longitude (°W)</u>		<u>Bottom Depth (m)</u>	
B03	26	1720	28 Apr 1987	70°	37.7	147°	07.7	38	
<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>Po₄ (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>
7.3	30.811	-1.600	24.772	9.03	0.85	8.97	1.90	0.05	0.01
12.3	30.820	-1.607	24.780	9.05	0.87	8.87	1.97	0.05	0.03
17.3	30.828	-1.611	24.787	9.03	0.88	9.67	1.97	0.05	0.00
22.3	31.218	-1.718	25.105	9.07	0.91	10.46	2.42	0.08	0.00
27.3	31.494	-1.734	25.329	8.97	0.92	10.45	2.48	0.08	0.00
31.3	31.615	-1.707	25.427	8.39	1.00	12.95	3.72	0.08	0.00

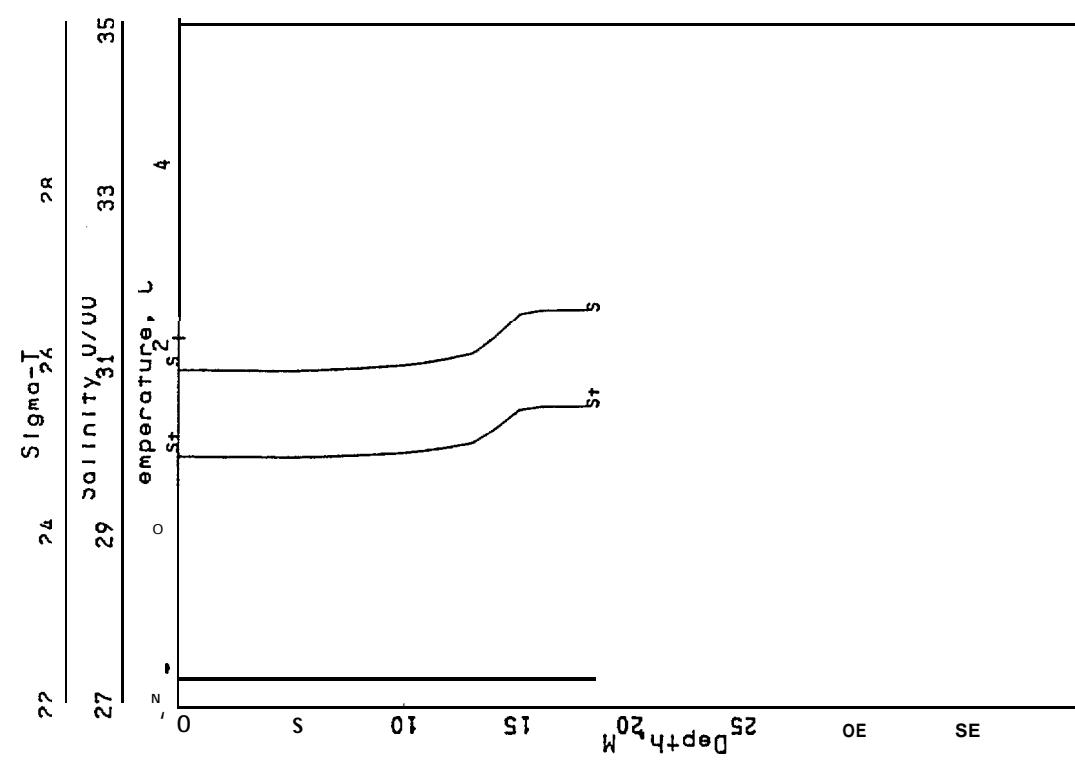
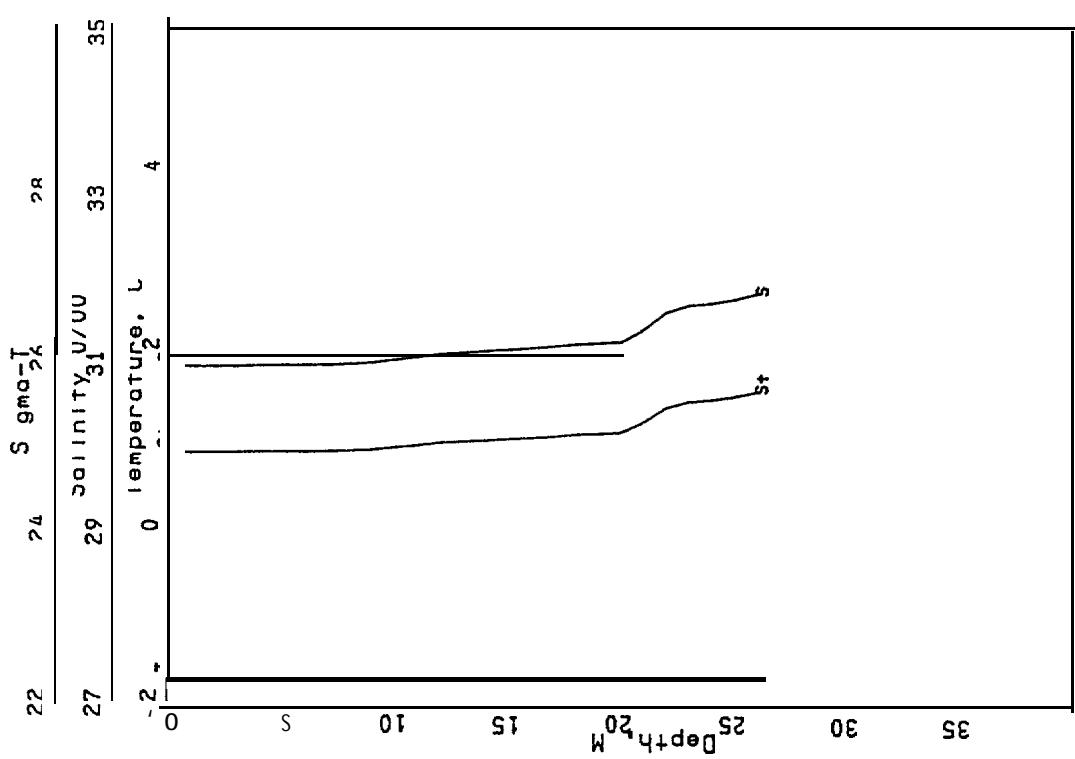
23



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<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longit ude</u>		<u>Bottom Depth(m)</u>	
B02	27	1855	28	Apr 1987	70°	32.0	147°	'15.0	32	
<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>P_O (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>	
2.3	30.974	-1.705	24.907	8.93	0.88	9.52	2.18	0.06	0.00	
7.3	31.006	-1.706	24.932	8.97	0.90	8.70	2.22	0.06	0.00	
12.3	31.142	-1.714	25.043	8.97	0.91	9.34	.	2.27	0.06	0.03
17.3	31.237	-1.719	25.121	9.00	0.88	9.40	2.14	0.07	0.00	
22.3	31.660	-1.714	25.464	8.69	0.94	10.60	2.89	0.06	0.00	
24.3	31.775	-1.733	25.558	8.67	0.94	11.40	2.91	0.07	0.00	

<u>Station</u>	<u>Cast</u>	<u>Time (UCT)</u>			<u>Latitude ("N)</u>		<u>Longit ude ('W)</u>		<u>Bottom Depth (m)</u>	
B01	28	2016	28	Apr 1987	70°	27.8	147°	20.0	23	
<u>Depth</u>	<u>S (PSU)</u>	<u>T (°C)</u>	<u>Sigma-t</u>	<u>O₂ (ml/l)</u>	<u>P_O (μm/l)</u>	<u>SiO₄ (μm/l)</u>	<u>NO₃ (μm/l)</u>	<u>NO₂ (μm/l)</u>	<u>NH₃ (μm/l)</u>	
2.3	30.945	-1.703	24.882	9.01	0.88	8.87	2.09	0.04	0.00	
5.3	30.947	-1.702	24.884	8.99	0.88	8.85	2.12	0.04	0.00	
8.3	30.982	-1.703	24.913	8.95	0.90	9.33	2.19	0.04	0.00	
11.3	31.055	-1.704	24.972	8.92	0.91	10.04	2.28	0.04	0.04	
14.3	31.368	-1.711	25.227	8.77	0.91	10.03	2.53	0.05	0.00	
17.3	31.680	-1.734	25.480	8.74	0.94	10.82	2.73	0.08	0.00	



Ref. no. 27 Sta. B02 70.53 N
 Time = 871182 16 Beaufort 147.25 W

Ref. no. 28 Sta. B01 70.46 N
 Time = 871182 16 Beaufort 147.33 W